

### **Amendments to the Claims**

This listing of claims will replace all prior versions, and listing, of claims in the application.

### **Listing of Claims:**

1. (Currently Amended) A mechanism for supporting a substrate to be coated with a film, which mechanism is used in a film forming apparatus, comprising:

a stage for receiving a substrate which has been transported into the film forming apparatus to form a film on the substrate;

a shaft member for angularly displacing the stage, that is bearing the substrate, from a substrate receiving position at which the stage received the substrate, to a film forming position at which a substrate bearing surface of the stage is vertical or substantially vertical;

a moving means; and

a plurality of support members that are arranged so as to consist essentially of one group of support members that extend only along one side of the substrate bearing surface of the stage,

wherein each of the plurality of support members of said one group are arranged so as to protrude from the substrate bearing surface of the stage and so the plurality of support members of said one group support only one end surface of the substrate when the stage is angularly displaced to the film forming position, where said one end surface is the surface of the substrate which faces downwards when the stage is angularly displaced to the film forming position, and

wherein said moving means is operably coupled to the plurality of support members of said one group members, and being configured and arranged for moving the plurality of support members relative to the substrate bearing surface.

~~\_\_\_\_\_ a plurality of support members which are provided so as to protrude from the substrate bearing surface of the stage;~~

~~\_\_\_\_\_ wherein said plurality of support members are arranged so as to consist essentially of one group of support members that extend only along one side of the substrate bearing surface of the stage and so said plurality of support members of said one group of support members support only one end surface of the substrate when the stage is angularly displaced to the film forming position, where said one end surface is the surface of the substrate which faces downwards when the stage is angularly displaced to the film forming position; and~~

~~\_\_\_\_\_ moving means, operably coupled to the support members of said one group of support members, for moving the support members relative to the substrate bearing surface.~~

2. (Currently Amended) A mechanism for supporting a substrate to be coated with a film, which mechanism is used in a film forming apparatus, comprising:

a stage for receiving a substrate which has been transported into the film forming apparatus to form a film on the substrate;

a shaft member for angularly displacing the stage, that is bearing the substrate, from a substrate receiving position at which the stage received the substrate, to a film forming position at which a substrate bearing surface of the stage is vertical or substantially vertical;

~~\_\_\_\_\_ a moving means; and~~

~~\_\_\_\_\_ a plurality of support members that are arranged so as to consist essentially of one group of support members that extend only along one side of the substrate bearing surface of the stage,~~

~~\_\_\_\_\_ wherein each of the plurality of support members of said one group are arranged so as to protrude from the substrate bearing surface of the stage and so the plurality of support members of said one group support only one end surface of the substrate when the stage is angularly displaced to the film forming position, where said one end surface is the surface of the substrate which faces downwards when the stage is angularly displaced to the film forming position, and~~

~~\_\_\_\_\_ wherein said moving means is operably coupled to the plurality of support members of said one group members, and being configured and arranged for moving the plurality of support members relative to the substrate bearing surface~~

~~\_\_\_\_\_ a plurality of support members which are provided so as to protrude from the substrate bearing surface of the stage;~~

~~\_\_\_\_\_ wherein said plurality of support members are arranged so as to consist essentially of one group of support members that extend only along one side of the substrate bearing surface of the stage and so said plurality of support members of said one group of support members support only one end surface of the substrate when the stage is angularly displaced to the film forming position, where said one end surface is the surface of the substrate which faces downwards, when the stage is angularly displaced to the film forming position;~~

~~\_\_\_\_\_ moving means, operably coupled to the support members of said one group of support members, for moving the support members relative to the substrate bearing surface; and~~

wherein the moving means causes each of the plurality of support members to move in parallel in one direction of three dimensional directions on the stage or causes each of the plurality

of support members to rotationally move on the stage about a longitudinal axis  $X$  of each support member.

3. (Previously Presented) The mechanism for supporting a substrate to be coated with a film of claim 1, wherein the moving means moves each of the plurality of support members of said one group of support members towards or away from the shaft member.

4. (Previously Presented) The mechanism for supporting a substrate to be coated with a film of claim 1, wherein the moving means is connected together with a plurality of the support members of said one group of support members and moves the plurality of support members in one operation.

5. (Previously Presented) The mechanism for supporting a substrate to be coated with a film of claim 1, further comprising a plurality of moving means, wherein the plurality of the moving means are operably coupled to the plurality of support members of said one group of support members such that each of said plurality of support members is moved independently.

6. (Original) The mechanism for supporting a substrate to be coated with a film of claim 1, wherein the moving means is an actuator.

7. (Previously Presented) The mechanism for supporting a substrate to be coated with a film of claim 1, wherein said each of the plurality of support members of said one group of support members is formed in a columnar shape.

8. (Original) The mechanism for supporting a substrate to be coated with a film of claim 1, wherein the substrate is a glass substrate or a semiconductor wafer.

9. (Canceled)

10. (Canceled)

11. (Canceled)

12. (Canceled)

13. (Previously Presented) The mechanism for supporting a substrate to be coated with the film of claim 1, wherein each of the plurality of support members of said one group of support members has a longitudinal axis that extends from the substrate bearing surface and wherein the moving means is configured and arranged so as to cause each of the plurality of support members of said one group of support members to move in one direction with respect to a plane in which lies the longitudinal axis of each of the support members of said one group of support members.

14. (Previously Presented) The mechanism for supporting a substrate to be coated with the film of claim 1, wherein each of the plurality of support members of said one group of support members has a longitudinal axis that extends from the substrate bearing surface and wherein the

moving means is configured and arranged so as to cause each of the support members of said one group of support members to move in a direction generally perpendicular to a plane in which lies the longitudinal axis of each of the support members of said one group of support members .

15. (Previously Presented) The mechanism for supporting a substrate to be coated with the film of claim 1, wherein the moving means is configured and arranged so as to cause each of the support members of said one group of support members to move in a direction generally perpendicular to the substrate end surface.

16. (Currently Amended) The mechanism for supporting a substrate to be coated with the film of claim 1, wherein each of the plurality of support members of said one group of support members has a longitudinal axis that extends from the substrate bearing surface and wherein the moving means is configured and arranged so as to cause each of the support members of said one group of support members to rotate about the longitudinal axis of each support member of said one group of support ~~members~~ ~~members~~.

17. (Currently Amended) A mechanism for supporting a substrate to be coated with the film, which mechanism is used in a film forming apparatus, comprising:

a stage for receiving a substrate which has been transported into the film forming apparatus to form a film on the substrate;

a shaft member for angularly displacing the stage, that is bearing the substrate, from a substrate receiving position at which the stage received the substrate, to a film forming position at which a substrate bearing surface of the stage is vertical or substantially vertical;

~~\_\_\_\_\_ a moving means; and~~

~~\_\_\_\_\_ a plurality of support members that are arranged so as to consist essentially of one group of support members that extend only along one side of the substrate bearing surface of the stage,~~

~~\_\_\_\_\_ wherein each of the plurality of support members of said one group are arranged so as to protrude from the substrate bearing surface of the stage and so the plurality of support members of said one group support only one end surface of the substrate when the stage is angularly displaced to the film forming position, where said one end surface is the surface of the substrate which faces downwards when the stage is angularly displaced to the film forming position,~~

~~\_\_\_\_\_ wherein said moving means is operably coupled to the plurality of support members of said one group members, and being configured and arranged for moving the plurality of support members relative to the substrate bearing surface, and~~

~~\_\_\_\_\_ a plurality of support members which are provided so as to protrude from the substrate bearing surface of the stage;~~

~~\_\_\_\_\_ wherein said plurality of support members are arranged so as to consist essentially of one group of support members that extend only along one side of the substrate bearing surface of the stage and so said plurality of support members of said one group of support members support only one end surface of the substrate when the stage is angularly displaced to the film forming position; where said one end surface is the surface which faces downwards when the stage is angularly~~

~~displaced to the film forming position, each of the plurality of support members of said one group of support members having a longitudinal axis that extends from the substrate bearing surface;~~  
~~moving means, operably coupled to the support members of said one group of support members, for moving the support members relative to the substrate bearing support surface, and~~

wherein the moving means is configured and arranged so as to cause each of the support members of said one group of support members to one of:

(a) move in one direction with respect to the longitudinal axis X of each support member,

(b) move in a direction generally perpendicular to the longitudinal axis X of each support member,

(c) move in a direction generally perpendicular to the substrate end surface, or

(d) rotate about the longitudinal axis X of each support member.

18. (Previously Presented) The mechanism for supporting a substrate to be coated with a film of claim 1, wherein the said plurality of support members of said one group of support members are further arranged so as to also complement a shape of an end of the substrate, the end that corresponds to said one end surface of the substrate.

19. (Previously Presented) The mechanism for supporting a substrate to be coated with a film of claim 2, wherein the said plurality of support members of said one group of support



members are further arranged so as to also complement a shape of an end of the substrate, the end that corresponds to said one end surface of the substrate.

20. (Previously Presented) The mechanism for supporting a substrate to be coated with a film of claim 17, wherein the said plurality of support members of said one group of support members are further arranged so as to also complement a shape of an end of the substrate, the end that corresponds to said one end surface of the substrate.

21. (New) A film forming apparatus comprising:

(a) a first chamber;

a valve; and

a second chamber for coating a substrate with a film, the first chamber, the valve and the second chamber being arranged in this order;

the apparatus further comprising:

(b) an exhaust pipe for exhaust of the second chamber; wherein

(c) a robot is housed in the first chamber,

which robot has an arm, and in connection with an opening/closing operation of the valve and an exhaust operation from the exhaust pipe, receives a substrate, transports the substrate to the second chamber through the first chamber and returns a substrate coated with a film in the second chamber to the first chamber;

(d) a support mechanism is housed in the second chamber, which support mechanism includes

(d1) a stage formed in a rectangular plate-shape having a flat substrate bearing surface by which the substrate is received,

(d2) a pair of link members connected to the stage,

(d3) a shaft member which is linked by the pair of link members, extends in a horizontal first direction X and is rotatable to angularly displace about the first direction X between a substrate receiving position and a film forming position, the substrate receiving position being a position where the substrate is received by the substrate bearing surface by the arm of the robot and the substrate bearing surface returns thereto after the film formation, at which position the bearing surface is horizontal, and the film forming position being a position where the substrate is coated with a film, at which position the substrate bearing surface is vertical,

(d4) a pair of support pins provided at an end portion of the substrate bearing surface so as to protrude upright from the substrate bearing surface, and formed in a columnar shape, for supporting an end surface of the substrate from beneath, by contacting the end surface of the substrate, and

(d5) an actuator connected to the support pins and enabling the support pins to move in a direction in which the support pins either move towards or away from the shaft member along a second direction Y perpendicular to the first direction X, for moving the support pins to separate the support pins from the end surface of the substrate when, after the film formation on the substrate,

the stage returns from the film forming position where the substrate bearing surface is vertical to the substrate receiving position where the substrate bearing surface is horizontal.

22. (New) The film forming apparatus of claim 21, wherein the actuator separates the support pins from the end surface of the substrate by means of a cyclic oscillating movement of the support pins in the second direction Y.

23. (New) A film forming method, comprising:  
opening a valve provided between a first chamber and a second chamber and transporting a substrate to the second chamber by means of an arm of a robot housed in the first chamber, a support mechanism being housed in the second

chamber;

the support mechanism including,

(a1) a stage formed in a rectangular plate-shape having a flat substrate bearing surface by which the substrate is received,

(a2) a pair of link members connected to the stage,

(a3) a shaft member which is linked by the pair of link members, extends in a horizontal first direction X and is rotatable to angularly displace about the first direction X between a substrate receiving position and a film forming position, the substrate receiving position being a position where the substrate is received by the substrate bearing surface by the arm of the robot and the substrate bearing surface returns thereto after the film formation, at which position the bearing

surface is horizontal, and the film forming position being a position where the substrate is coated with a film, at which position the substrate bearing surface is vertical,

(a4) a pair of support pins provided at an end portion of the substrate bearing surface so as to protrude upright from the substrate bearing surface, and formed in a columnar shape, for supporting an end surface of the substrate from beneath, by contacting the end surface of the substrate, and

(a5) an actuator connected to the support pins and enabling the support pins to move in a direction in which the support pins either move towards or away from the shaft member along a second direction Y perpendicular to the first direction X, for moving the support pins to separate the support pins from the end surface of the substrate when, after the film formation on the substrate, the stage returns from the film forming position where the substrate bearing surface is vertical to the substrate receiving position where the substrate bearing surface is horizontal,

the film forming method, further comprising:

placing the substrate on the horizontal substrate bearing surface of the stage at the substrate receiving position by the arm,

angularly displacing the shaft member so that the substrate bearing surface is at the film forming position where the substrate bearing surface is vertical, supporting the end surface of the substrate from beneath by the pair of support pins, and coating the substrate with a film, there being in a state where exhaust from an exhaust pipe is performed with the valve closed during the film formation,

Applicant: M. Kawaguchi  
U.S.S.N. : 09/470,615  
Response to Final Office Action  
Page 15 of 25

after the film formation, returning the substrate bearing surface to the horizontal substrate receiving position; moving the support pins along the second direction Y by the actuator to separate the support pins from the end surface of the substrate; and

opening the valve and transporting the substrate from the second chamber by the arm.